

Echidna trains in a fragmented forest environment

My wife and I live on a property on the basalt plain formed by the lava flow from Mt Warrnambool in south-western Victoria. Our property consists of 20.2 ha of remnant native vegetation and is almost completely surrounded by paddocks; however, it is linked to other areas of native vegetation (both larger and smaller than ours) by a network of corridors consisting of roadside vegetation, vegetation on the sides of the nearby creek, and uncleared road reserves. Our property is within the fragmented forest environment at Naringal. According to Bennett (1988; 1989), less than 10% of the forest that previously covered this area has not been cleared; none of the remaining forest patches are larger than 100 ha, and 90% are smaller than 20 ha. The canopy of our property is mainly Messmate *Eucalyptus obliqua* but with patches of Manna Gum *E. viminalis* and Swamp Gum *E. ovata*. The ground cover is mainly Austral Bracken *Pteridium esculentum* but with Variable Sword-sedge *Lepidosperma laterale* in wetter areas and grasses and herbs in drier, rockier areas.

We began living on the property in 1996 and often have seen diggings of the Short-beaked Echidna *Tachyglossus aculeatus*. We regularly, but not frequently, have seen echidnas when walking or working in our bush and often have been alerted to their presence by the sound of their movement in dry undergrowth. It is possible that we observed the same echidna from one time to the next, but we also have noted differences in size and colour at times suggesting we have seen a number of different individuals. For a number of years we have seen echidnas more frequently during summer as they have come to the two or three large dishes near our house that we try to keep filled with water, effectively creating a group of small permanent waterholes.

Observations

Against this background of regular but infrequent observations of echidnas, we made three

unusual observations during 2013. On 22 June, at about 12 noon on a clear, calm day, I was surprised to find that an echidna had come up to where I was working. A short time later I noticed two echidnas about 5 m away. One, presumably male, was trying to climb onto the other, presumably female. I was on the southern edge of a small (20 m diameter) wet area surrounded by messmate forest but naturally clear of trees and mostly covered with sedges. Blackberry plants *Rubus* sp. had become well-established in this wet, sunlit area and I was working at digging them out. The two echidnas were 2 or 3 m from the sedges and on the edge of an area of dry, 1 m high bracken; however, the area between us was relatively bare and unshaded so that I had a well-lit, unobstructed view of them. As I continued to watch, the echidnas moved a short distance (less than a metre) and the male began to work his feet against the female. It was not clear what he was trying to do. Eventually he was partly on top of the female but a little to one side and with his rear end curved beneath her. He was moving his rear end rhythmically, suggesting that copulation was occurring, and this behaviour continued for at least five minutes. I attempted to move behind them, maintaining my distance, in order to see how much to the side the male was, but they disengaged and waddled off, nose to tail.

Some years earlier, I heard a radio program in which Peggy Rismiller described her research on echidnas on Kangaroo Island. I remembered her descriptions of echidna 'trains' and assumed I was observing an echidna train. Rismiller also described the digging of trenches before echidnas mated but when I examined the area where the echidnas had been, I found they had not dug a trench. The two echidnas had been on top of three branches lying roughly parallel on the ground. One branch was 10 cm in diameter and the other two were 8 cm in diameter. The second branch was 10 cm away from and 8 cm lower than the first branch, and the third

branch was 7 cm away from and 4 cm higher than the second branch. Between the first and second branches there was a trench 40 cm long and 20 cm deep measured from the top of the highest branch. At one end of the trench there was a small tunnel and at the other end there was soil which had been dug out. This was almost certainly the work of a Bush Rat *Rattus fuscipes*.

On 23 August, at about 8 pm, my wife observed three echidnas in a line crossing our drive. She noticed they were different in size and her first thought was that they were a family group. Then she observed the third one climbing onto the second one and this apparently sexual behaviour suggested to her that the three of them were an echidna train. They moved out of the light from the headlights of her car before she could make any further observations. When we discussed this later, I pointed out that the second and third echidnas would be males. She then suggested that what she had interpreted as sexual behaviour may have been competitive behaviour between the males.

On 3 September, I was working in the same area as on 22 June and I saw two echidnas which were obviously together. There was a third echidna in the same general area, but this echidna did not seem to be part of the train; however, I assumed these three echidnas were the ones in the train my wife observed on 23 August. I watched the first two echidnas and saw them engage in the same behaviour in almost exactly the same location as on 22 June. That is, one echidna, presumably a male, was on top of the other echidna, presumably a female, and was moving his rear end rhythmically. This behaviour continued for some time. This time the male was further forward on the female and his rear end was not curved beneath her, so I did not think that copulation could have occurred.

Discussion

Cronin (1991) states that echidnas mate in July and August, but Augee, *et al* (2006) state that

mating time is generally agreed to be from June to early September. The date of my observation is consistent with the latter statement. They state also that the first observation of echidnas mating is probably one reported by Robert Broom in 1895, which they quote, stating that mating occurred in 'a slight hollow at the root of a tree' and with male and female 'front to front' (pp. 80–81). They point out that this is the most frequently reported mating position in captive animals. They go on to summarise the observations of mating in the wild by Rismiller and her colleagues who found that the female lies flat on her stomach, often at the base of a shrub or small tree, and the male digs a trench under the female's tail, uses his hindlimb to lift her tail, lies on his side in the trench, and inserts his extended penis into her cloaca. Augee *et al.* comment, 'Lying in a trench may also support the male and help prevent him from rolling over onto his back.' Augee *et al.* note that copulation is said to last for 30 to 180 minutes, after which the animals go their separate ways. Given that the behaviour I observed on 22 June lasted only 5 minutes, and given that the animals did not go their separate ways after this behaviour, I consider this behaviour must have been courtship rather than copulation as I originally believed, and as I had surmised for my observations on 3 September.

References

- Augee M, Gooden B and Musser A (2006) *Echidna: extraordinary egg-laying mammal* (CSIRO Publishing, Australian Natural History series: Collingwood, Victoria)
 Bennett AF (1988) Roadside vegetation: a habitat for mammals at Naringal, South-Western Victoria. *The Victorian Naturalist* **105**, 106-113.
 Bennett AF (1989) Wildlife Conservation in the Naringal Area, South-Western Victoria. (Arthur Rylah Institute for Environmental Research: Heidelberg, Victoria)
 Cronin, L (1991) *Key guide to Australian mammals* (Reed Books: Balgowlah, NSW)

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